

Serial No.: 10/760,496
Response to Office action of October 9, 2007

Attorney Docket No.: FS-F03224-01OA

Remarks

1. Amendments

By the present Amendment, claim 1 has been amended. Upon entry of the present Amendment, claims 1, 4-24, 26-28 and 33-34 will be pending in the application.

"An application amount of the photosensitive silver halide is 0.5 mol% to 15 mol% per one mol of silver of the non-photosensitive organic silver salt" is supported on page 205, lines 6-9 of the specification.

A compound having an adsorption group to silver halide and a reducing group "at a coating amount of 1×10^{-6} mol to 1 mol per one mol of the photosensitive silver halide" is supported on page 46, lines 3-7 of the specification.

Therefore, applicant submits that all of the present amendments are supported in the specification and that the present amendments add no new matter.

2. Comments

Paragraph 2: objection to the specification

By the present amendment, the objection to the specification has been overcome.

Paragraph 4: rejection of claims 1, 4-9, 22-24, 26 and 33-34 under 35 U.S.C. 103(a)

Claims 1, 4-9, 22-24, 26 and 33-34 were rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Okada et al (US 6,120,983) (hereinafter referred as "Okada"), Oya et al (US 2002/0048732) (hereinafter referred as Oya '732"), Oya et al (US 2003/0235791) (hereinafter referred as "Oya '791"), Oyamada et al US 2003/0087204 (hereinafter referred as "Oyamada"), Winslow et al (US 5,891,615) (hereinafter referred as "Winslow") and Purol et al (US 5,236,816) (hereinafter referred as "Purol").

Serial No.: 10/760,496
Response to Office action of October 9, 2007

Attorney Docket No.: FS-F03224-01OA

Paragraph 5: rejection of claims 10-14 and 27 under 35 U.S.C. 103(a)

Claims 10-14 and 27 were rejected under 35 U.S.C.103(a) as being unpatentable over Okada in combination with Tsuzuki et al (US 5,677,121) (hereinafter referred as "Tsuzuki") and EP 1096310A2 (herein after referred as "EP '310"), Winslow and Purol.

Paragraph 6: rejection of claims 15-21, 28 under 35 U.S.C. 103(a)

Claims 15-21 and 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Okada and Fukui et al.(US 2002/0102502A1) (hereinafter referred as "Fukui"), Winslow and Purol.

The examiner stated that "the 1-phenyl-3-pyrazolidone has been known as an equivalent reducing agent for silver ion such as taught in Winslow and Purol. It would have been obvious to the worker of ordinary skill in the art at the time the invention was made to use the development accelerator known in Oya '732, Oya '791 and Oyamada in combination with the use of a known equivalent reducing agent for silver ion taught in Winslow or Purol in the material of Okada with an expectation of increasing the speed of development and an formation of silver image, and thereby provide a material claimed."

Applicant respectfully disagrees.

The allegation by the examiner that the compound having an adsorption group and a reducing group in the present invention (hereinafter referred as an "adsorptive reductive compound") is equivalent to the reducing agent for silver during development taught in Winslow or Purol is not correct.

A reducing agent for image forming which reduces silver ions to silver is needed in equivalent molar ratio with silver ions according to a reaction molar ratio. In a photothermographic material, as the non-photosensitive organic silver salt is a silver ion source for forming a silver image, a reducing agent for the development is needed at a comparable amount with the non-photosensitive organic silver salt.

Serial No.: 10/760,496
Response to Office action of October 9, 2007

Attorney Docket No.: FS-F03224-01OA

In contrast, a photosensitive silver halide is 0.5 mol% to 15 mol% per one mol of silver of a non-photosensitive organic silver salt, and an adsorptive compound is contained at a coating amount of 1×10^{-6} mol to 1 mol per one mol of the photosensitive silver halide. Therefore, the amount of the adsorptive reductive compound is relatively small with respect to the amount of the non-photosensitive organic silver salt. Therefore, the adsorptive reductive compound in the invention does not have a function as a developer, and clearly is not equivalent to a reducing agent for silver ion.

The adsorptive reductive compound in the invention adsorbs to the photosensitive silver halide, and has an effect in a latent image formation process during imagewise exposure. It is believed that the reaction mechanism of the adsorptive and reductive compound in the present invention is that during absorption of exposure light by silver halide, a photo-electron and a hole are produced on the silver halide grain; the adsorptive reductive compound captures the hole and prevents a recombination of the photo-electron and the hole. The recombination of the photo-electron and the hole is an inefficient process in photographic sensitivity, and the prevention of the recombination results in increasing photographic sensitivity. As the adsorptive and reductive compound in the invention acts during a latent image forming process, only a small amount of 1×10^{-6} mol to 1 mol per one mol of the photosensitive silver halide is required.

As described above, the 1-phenyl-3- pyrazolidone taught in Winslow and Purol and the adsorptive and reductive compound in the invention are different from each other in their function and composition in the photothermographic material with respect to the ratio of the 1-phenyl-3- pyrazolidone or the adsorptive and reductive compound to the silver halide or silver ions.

Therefore, it would not have been obvious for a worker of ordinary skill in the art to combine a 3- pyrazolidone group with Okada based on the description of Winslow or Purol.

Serial No.: 10/760,496
Response to Office action of October 9, 2007

Attorney Docket No.: FS-F03224-01OA

Oya '791, Oya '732, and Oyamada were referred as a reference to disclose a development accelerator.

Tsuzuki and EP '310 are used as references disclosing an organic silver salt having a specific content of silver behenate, and a polymer latex as a binder, respectively.

Fukui is used for the disclosure of a polyhalogen compound.

None of these references overcome the deficiencies of Okada in view of Winslow and Purol. Therefore, it is respectfully requested that these rejection be withdrawn.

In the Office action, the examiner requested a showing that the compound having an adsorption group and a reducing group according to the present invention provides unexpected results in comparison with the compound disclosed in Okada. A declaration under 37 C.F.R. 1.132 is being submitted in response to this request.

Sample Nos. E, F, C, D, G, H listed in Table A were prepared in a similar manner in that of Sample Nos. 1 to 3 in Table 15 (see page 423) of Example 1 of the present specification, except that the compound having an adsorption group and a reducing group in the present invention or the compound described in Okada, a development accelerator and a reducing agent were added as disclosed in Table A.

The obtained data presented in Table A clearly shows that sample Nos. C and D containing the compound having an adsorption group and a reducing group in the present invention resulted in an unexpectedly superior performance of a significantly large increase in sensitivity while maintaining low fog, stable raw stock storability and image stability. In contrast, comparative sample Nos. E and F which used compound 1 or 2 of Okada did not provide an increase of sensitivity and resulted in lower raw stock storability than sample Nos. C or D.

Sample Nos. G and H are comparative samples which include the compound having an adsorption group and a reducing group, but do not include any reducing agent.

Serial No.: 10/760,496
Response to Office action of October 9, 2007

Attorney Docket No.: FS-F03224-01OA

These samples resulted in no image being formed, and thus it shows that the compound having an adsorption group and a reducing group according to the present invention cannot produce an image by itself without a reducing agent.

In view of the foregoing amendments and remarks, it is respectfully submitted that all of the pending claims are in condition for allowance. Early and favorable action is respectfully requested.

Respectfully submitted,



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